

Dog Bites in Norfolk, Va.

CHARLES MORTON, RS

ANIMAL bite data accumulated by the Rabies Control Program of the Norfolk, Va., Health Department for January 1 to June 30, 1971, showed a rate of 319 animal bites per 100,000 people for these 6 months. A total of 957 bites were reported for the period—843 by dogs, 84 by cats, and 30 by other animals. Medical and public health expenses resulting from the bites caused considerable economic loss to the citizens of Norfolk.

No reported or confirmed cases of human rabies have occurred in Norfolk for decades. Except for one case of rabies in a bat, confirmed by the public health laboratory, no other confirmed case of animal rabies of any kind has occurred in Norfolk in 15 years. In the past, however, dog bites were a common source of human rabies. Furthermore, people are bitten by dogs more often than by other domestic animals, and dog bites cause human injury, pain, and anxiety, as well as public and private expense. For these reasons and because of the substantial number of dog bites in the city which the health department must investigate to rule out possible rabies, the 6-month data were compiled and analyzed for relevant factors which might lead to sound recommendations for prevention of dog bites.

All dog bites reported in Norfolk during January 1 to June 30, 1971, were studied in detail. The first half of the year was selected for review because dog bites are more prevalent during this time. Reports of dog bites were received from physicians, hospitals, military establishments, and

the victims. The report forms used contained detailed questions about each dog bite accident—date of bite; victim's name, address, telephone number, age, and sex; anatomic location of the bite; severity of the wound; breed of animal inflicting the bite and its color, sex, and size; status of the animal's rabies immunization, its license tag, and its owner's name and address.

Of the 843 dog bites reported during the 6 months, 73 occurred in January, 107 in February, 103 in March, 176 in April, 176 in May, and 208 in June. The monthly incidence was 28 bites per 10,000 people. (Reports for previous years indicate that the incidence of bites for the last 6 months of 1971 would not have been of the same magnitude as the first 6 months.)

From a map with colored pins for each month showing the distribution of animal bites throughout Norfolk, it was determined that possibly 10–20 percent of the animal bites were not reported. The distribution was particularly sparse in some of the lower socioeconomic areas. Also, it is known that some bites are not reported because the victims, especially when they are the dogs' owners, do not seek medical treatment.

Sex and Age of Victims

Sex. The semiannual incidence of dog bites per 10,000 people was 32.38 for males and 21.49 for females. Males were bitten a third more frequently than females. This striking sex difference is more apparent among victims under 10 years old. Males, generally more aggressive than females, are more likely to have dogs as pets; thus they are likely to suffer more dog bites. It is generally believed that females prefer cats as pets. Moreover, as shown in table 1, males in every age group had higher rates of dog bites than females.

Age. Victims' ages are an important variable

Mr. Morton is supervisor of the rabies control section, division of environmental health, Norfolk Health Department. Tearsheet requests to Charles Morton, Norfolk Health Department, 401 Colley Ave., Norfolk, Va. 23507.

in dog bite incidence. Of all the victims, 73 percent were under 20 years old: 18 percent were aged 0-4 years; 30 percent, 5-9 years; and 25 percent, 10-19 years.

Perhaps a more meaningful measure of high-risk groups by age would be the rate of dog bites per 10,000 people. Both sexes aged 5-9 years experienced the highest rate of bites (table 1). The second highest bite rate for males was in the age group 10-19 years, whereas for females it was in the age group under 5 years. Children and youth probably have the highest bite rates because they are intimately associated with dogs as pets, they often abuse pets, and, in many instances, they do not know how to properly take care of their dogs. Also, children are more likely to excite dogs by playing ball, running, bicycling, and participating in other action games.

Location and Severity of Wounds

The majority of the dog bites (71 percent) were inflicted on the extremities—33 percent on the arms and 38 percent on the legs (table 2). This anatomic distribution of bites is consistent with the height of dogs in relation to man and

with the fact that people use their arms in an effort to prevent dogs from biting. It is also consistent with the observation that the extremities provide a better biting surface for dogs. It is shocking that 129, or 15 percent, of the dog bites occurred on the victims' head, face, or neck; 48 percent of these victims were children under age 10, and 25 percent of the dogs inflicting the wounds were German Shepherds whose height is usually about level with younger children's heads.

The severity of the dog bite wounds was classified as (a) none—producing no detectable injury; (b) minor—producing abrasions, lacerations, contusions, and punctures; (c) moderate—requiring several sutures; and (d) severe—disabling the victim for a period of time or requiring a large number of sutures. Of the 843 reported dog bites, 21 or 2.5 percent produced no detectable injury, 781 or 92.6 percent resulted in minor injuries, 2 or 0.4 percent were moderate injuries, and 39 or 4.5 percent were severe injuries (table 2). There were no fatal injuries.

Dog bites which result in no detectable injury probably occur in greater numbers than indicated in these data because the victims often do not seek

Table 1. Incidence of dog bites in Norfolk, January 1-June 30, 1971

Age group (years)	Males			Females		
	Population at risk	Number bites reported	Rate per 10,000	Population at risk	Number bites reported	Rate per 10,000
0-4.....	13,018	91	69.89	12,858	68	52.88
5-9.....	13,809	162	117.30	13,412	90	67.10
10-19.....	29,780	148	54.67	26,173	62	23.69
20-29.....	50,753	33	6.50	25,077	28	11.15
30-39.....	18,922	25	13.21	16,179	16	9.89
40-49.....	14,969	27	18.03	15,380	14	9.10
50-59.....	9,994	22	22.01	14,262	17	11.92
60-69.....	9,910	19	19.17	9,424	6	6.37
70 and over.....	5,298	12	22.65	8,733	3	3.44
Total.....	166,453	539	32.38	141,198	304	21.49

Table 2. Anatomic location and severity of dog bite wounds of victims, Norfolk, January 1-June 30, 1971

Location of wounds	Severity of wounds				Total	
	None	Minor	Moderate	Severe	Number	Percent
Upper extremities.....	6	256	0	11	273	33
Lower extremities.....	11	298	2	13	324	38
Head, face, neck.....	0	120	0	9	129	15
Trunk, excluding back.....	0	40	0	2	42	05
Back and buttocks.....	4	67	0	4	75	09
Total.....	21	781	2	39	843	100



medical treatment. Also many persons with minor injuries resulting from dog bites probably do not seek medical treatment. Therefore, probably somewhat less than 10 percent of all dog bites produce moderately severe and severe injuries.

Occurrence by Month and Day

Winter-summer distribution of dog bite accidents indicated a lower bite rate in January with an increase in the following months to a peak in June. According to observations and records, dog

bite accidents are most frequent in May or June in Norfolk. There is reason to believe that this seasonal variation of dog bites is nationwide, although probably not as marked in warmer sections of the country. The high incidence of bites during June likely resulted from more children being exposed to dogs at this time.

During the winter months most dog bites occurred on Saturday and Sunday. Of the 843 reported bites, 104 or 11.9 percent occurred on Monday, 113 or 13.8 percent on Tuesday, 127 or 15.3 percent on Wednesday, 104 or 11.9 percent on Thursday, 118 or 14.0 percent on Friday, 144 or 17.3 percent on Saturday, and 133 or 15.8 percent on Sunday. The high bite rates on Saturday and Sunday and the high incidence of reported bites (73 percent) among children and youth under age 20 indicate that young people have a high degree of exposure to dogs on these 2 days

Characteristics of Biting Dogs

The breed and sex of dogs inflicting bites during the period studied are shown by rank order in table 3. Other pertinent factors were also elicited from the dog bite forms sent in by the various reporting agencies—names and addresses of owners, date of vaccination, if any, and current license number, if any.

Sex. Of the dogs inflicting bites 440 or 52.3

Table 3. Breed and sex of dogs inflicting bites, Norfolk, January 1–June 30, 1971

Breed ¹	Total bites		Male		Female		Unknown sex	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Mixed.....	350	41.5	180	51.4	148	42.3	22	6.3
German Shepherd.....	211	25.0	104	49.3	86	40.7	21	9.9
Poodle.....	37	4.4	28	75.6	7	18.9	2	5.5
Dachschund.....	31	3.8	20	64.5	6	19.3	5	11.2
Cocker.....	29	3.5	12	41.4	13	44.8	4	13.8
Terrier.....	28	3.4	16	57.1	8	28.4	4	14.5
Collie.....	25	3.0	15	60.0	7	28.0	3	12.0
Beagle.....	24	2.9	12	50.0	9	37.5	3	12.5
Chihuahua.....	22	2.6	13	59.2	5	22.7	4	18.1
Unknown.....	17	2.0	17	100.0
Other hounds.....	12	1.4	6	50.0	4	33.3	2	16.7
Bulldog.....	9	1.0	5	55.5	3	33.3	1	11.0
Doberman.....	7	.8	7	100.0	0	0	0	0
Setter.....	7	.8	5	71.4	2	28.6	0	0
St. Bernard.....	7	.8	4	57.2	2	28.5	1	14.3
Boxer.....	5	.6	2	40.0	2	40.0	1	20.0
Pekingese.....	5	.6	3	60.0	2	40.0
Retriever.....	5	.6	4	80.0	1	20.0	0	0
Great Dane.....	3	.3	1	33.3	1	33.3	1	33.4
Pomeranian.....	3	.3	2	66.6	1	33.4	0	0
Chow.....	2	.2	1	50.0	0	0	1	50.0
Total.....	843	100	440	52.3	310	36.7	93	11.0

¹ Listed in rank order.



percent were male, 310 or 36.7 were female, and 93 or 11 percent were of unknown sex (table 3). The assumption that when female dogs care for newborn pups they bite more frequently than male dogs proved not true in this study; male dogs had a bite rate of 5.2 per 100 dogs compared with 3.6 per 100 for female dogs.

Breeds. Clinical impressions about the temperament of certain dog breeds have been expressed by veterinarians from time to time. This study, however, produced some answers to questions as to whether certain breeds of dogs were more likely than other breeds to bite people.

The information about the breeds of dogs listed in dog bite reports was arranged in broad categories as the most practical way to handle the data. Next to the mixed-breed dogs, which committed 350 or 41.5 percent of the bites, the German Shepherd, with 211 or 25 percent of all the bites, also produced most of the severe wounds. Mixed-breed and German Shepherd dogs together produced 66.5 of all reported bites. The Poodle was third highest with 37 or 4.4 percent reported bites. For the remaining 19 categories of dogs, bite reports ranged from 2 for the Chow to 31 for the Dachsund.



Dog population. One serious limitation in estimating a city's total dog population is the unknown number of stray or unlicensed dogs, or both, in the community at any given time. In Norfolk during 1971 the dog population was estimated to be 38,444, based on information from the municipal Bureau of Animal Control, the Norfolk Society for the Prevention of Cruelty to Animals, and dog bite report forms.

Records of the bureau indicated that 14,040 dog licenses were issued in 1970 and 12,061 during the first 6 months of 1971. These figures indicate that a large segment of Norfolk's canine population is not licensed, a conclusion buttressed by the fact that dog bite records showed 482 or 56

percent of the bites recorded were reported to have been inflicted by licensed dogs compared with 371 or 44 percent by unlicensed dogs.

Almost all the 6,555 dogs handled by the Norfolk SPCA in 1970 were unlicensed at the time. The organization secured homes for 2,486 dogs and found it necessary to put to sleep the balance of 4,069. SPCA records indicated that 98 percent or 6,423 dogs were not licensed when accepted for handling.

The Bureau of Animal Control, with limited personnel, in 1970 picked up from the streets of Norfolk 8,076 dogs, of which 3,576 were dead when taken. Another 3,228 of the total were put to sleep in the bureau's facilities.

Rabies immunization. Each year from 1965 to 1970, 1,000–1,500 dogs were immunized for rabies, with vaccine which gives 3-year immunity, in clinics organized by the Norfolk Health Department in conjunction with the Tidewater Veterinarians Association. The clinic which was organized and held in June 1971 immunized 1,913 dogs against rabies.

Despite the efforts of veterinarians and the Norfolk Health Department, more than 25 percent of the dogs inflicting wounds were not vaccinated against rabies, although 627 or 75 percent had evidence of immunization. As might be expected, dogs with licenses (472) showed evidence of vaccination against rabies—Norfolk's dog ordinance requires evidence of vaccination for the owner to secure a dog license. Adequate control measures plus mass rabies vaccination of the canine population have proved to be effective



means of eliminating canine rabies from a community.

With an estimated 1971 dog population in Norfolk of 38,444, and at least 25 percent not vaccinated, a conservative estimate could be more than 9,000 city dogs susceptible to rabies. Although Norfolk appeared to be relatively free of rabies at the time of this report, as it has been for some time, numerous cases of rabies continue to be reported in the wild animal population of some Virginia counties.

Discussion and Conclusions

This study of dog bite accidents in Norfolk is important for a number of reasons. Almost 10 percent of dog bites produce serious injury, although none in this study resulted directly in human death. Hundreds of people in Norfolk are bitten by dogs each year. Dogs are the primary source of human exposure to rabies, but only 10–20 people in this country died of rabies before 1960. Although the rabies toll has been reduced considerably in recent years, possibly because of the widespread immunization of dogs, other diseases are transmissible from dogs to man through biting.

Because of dog bites in Norfolk, four persons were given antirabies treatment in the last 3 months of 1970 and three persons in the first 6 months of 1971; the city paid for these treatments. Antirabies treatment is painful and sometimes severe. No records were available to indicate how many other persons received antirabies treatment for which they paid.

According to reports from State and Federal public health agencies from 1947 through 1970, as well as summaries of rabies vaccine doses issued for treatment of people published in the quarterlies of the National Communicable Disease Center Zoonoses Surveillance, each year an estimated 50,000 persons in this country receive antirabies treatment.

The Virginia State Health Department issued 3,356 doses of duck embryo vaccine in fiscal year 1971–72 (22 doses more than in the previous year) for human antirabies treatment. About once a week the Norfolk health director is asked for advice on whether a dog bite victim should be given antirabies treatment. Furthermore, the pub-

lic health laboratory annually performs 800 to 900 examinations of dead animals, chiefly dogs, suspected of rabies.

It is reasonable to expect that many dog bites can be prevented when the facts about how they take place are known.

An estimated 10 percent of the dog bites during the study period were not reported because of the low socioeconomic area of the city in which they took place, or because the bite produced no wound, or because the dog's owner was bitten. Otherwise, the reporting was reliable, except for 17 or 2 percent stray dogs which could not be located; thus, the data seem reliable and the findings of the study valid.

The findings also suggest that to prevent dog bites local communities should (a) try to prevent young children from coming in contact with strange dogs, (b) restrain or dispose of dogs which consistently bite people, (c) immunize dogs against rabies, (d) enforce city dog license ordinances, (e) impound all dogs without a license, (f) provide more facilities and personnel for catching and removal to the city pound of all unlicensed and stray dogs for humane disposal, if necessary, (g) encourage the public to consult a physician in case of a dog bite, (h) secure identification tags to each dog's collar listing the owner's name and address as well as the animal's immunization status, and (i) support public education to motivate dog owners to participate with their pets in approved dog obedience training courses.

Finally, it seems that the unlicensed and stray dog population of Norfolk is much larger than the 38,444 estimated, if the 3,576 dead dogs picked up on the streets with the additional 3,228 put to sleep by the Bureau of Animal Control, and the 4,069 put to sleep by the SPCA are taken into consideration. This is a total of 10,873 dead dogs for 1 year. These figures indicate an unlicensed and stray dog population more numerous than 26,383 which is the difference between the estimated 38,444 and the 12,061 licensed dogs. A reduction in this segment of the dog population would possibly reduce considerably the number of dog bite accidents occurring in Norfolk each year.